

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair Service Equipment And Tools

Service Equipment And Tools

NOTE:

*Order tools from the SERVICEGARD™ Catalog or from the European Microfiche Tool Catalog (MTC).
Some tools may be available from a local supplier.*

Bushing, Bearing and Seal Driver Set

To remove and install seals and bearings.

Puller Set

To remove bearing cups and cones.

Differential Lifting Tool.....JT38000

To remove and install differential drive shaft.

Hydraulic Ram.....D01103AA

To install differential drive shaft.

Spacer..... [DFT1103Dealer Fabricated Tool, see Group 0399 for instructions to make tool.]

To install cluster gear on drive shaft.

Rivet Forming Tool..... [DFT1121Dealer Fabricated Tool, see Group 0399 for instructions to make tool.]

To install differential ring gear rivets.

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair Other Material

Other Material

Number	Name	Use
AT124243 (U.S.)	SILASTIC 732 ® RTV Adhesive Sealant	To assemble lube pump.
TY6305 (U.S.) TY9485 (Canadian) 764 LOCTITE ® (LOCTITE®)	Clean and Cure Primer Products	To clean transaxle cover, top of transaxle case, ring gear and differential housing.
TY6304 (U.S.) TY9484 (Canadian) 515 LOCTITE ® (LOCTITE®)	Flexible General Purpose Sealant Products	To seal lube pump joint and reverser output shaft splines.
TY9375 (U.S.) TY9480 (Canadian) 592 TEFLON ® (LOCTITE®)	Pipe Sealant with Products	To seal MFWD transfer case quill cap screws.
TY9370 (U.S.) TY9477 (Canadian) 242 LOCTITE ® (LOCTITE®)	Thread Lock and Sealer (Medium Strength) Products	To assemble lube pump and install first and second shifter shaft plug and set screws.
T43515 (U.S.) TY9479 (Canadian) 635 LOCTITE ® (LOCTITE®)	Retaining Compound (Maximum Strength) Products	To assemble ring gear to differential housing.

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TX0350BD298-19-1993/04/06

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair Specifications

Specifications

Item	Measurement	Specification
Reverser Input Shaft	End Play	0.25-2.18 mm (0.010-0.86 in.)
Reverser Forward Clutch Pack	Clearance	0.5-0.9 mm (.021-.036 in.)
Reverser Bearing Retainer Cap Screws	Torque	57-68 N·m (42-50 lb-ft)
Reverse Output Yoke Nut	Torque	102-115 N·m (75-85 lb-ft)
Reverser Front Cover Cap Screw	Torque	37-50 N·m (27-37 lb-ft)
Reverser Charge Pump Cap Screw	Torque	23-30 N·m (17-22 lb-ft)
Axle	Weight	79 kg (175 lb)
Differential Assembly	Weight	25 kg (55 lb)
Differential Assembly Cover Cap Screws	Torque	47 N·m (35 lb-ft)
Differential Housing	Preload	0.05-0.13 mm (0.002-0.005 in.)
Differential Drive Shaft: New Bearings	Rolling Drag Torque	1-3 N·m (9-27 lb-in.)
Differential Drive Shaft: Used Bearing (Nominal spec)	Rolling Drag Torque	0.5-2 N·m (4-18 lb-in.)
Differential Drive Shaft: Differential Housing	Backlash	0.15-0.20 mm (0.006-0.008 in.)
Differential Drive Shaft: Differential Bearing Quill Cap Screws	Torque	48 ± 5 N·m (35 ± 4 lb-ft)
Differential Drive Shaft: Transmission Drive Shaft Front Bearing Cone-to-Snap Ring	Maximum Gap	0.152 mm (0.006 in.)
Differential Drive Shaft: Transmission Drive Shaft Quill Cap Screws	Torque	47 N·m (35 lb-ft)
Differential Drive Shaft: Transmission Drive Shaft	End Play	0.10-0.15 mm (0.004-0.006 in.)
Differential Drive Shaft: Shifter Shaft Detent Ball Springs	Free length Test length	25.5 mm (0.96 in.) 16 mm at 133.5 ± 16 N (0.64 in. at 30 ± 3.5 lb)
Differential Drive Shaft: Driven Gear	End Play	0.05-0.10 mm (0.002-0.004 in.)
Differential Drive Shaft: Output Shaft	End Play	0.05-0.10 mm (0.002-0.004 in.)
Differential Drive Shaft: Idler Shaft Retaining Strap Cap Screw	Torque	75 N·m (55 lb-ft)
Differential Drive Shaft: Drive Shaft Quill Cap Screws	Torque	75 N·m (55 lb-ft)

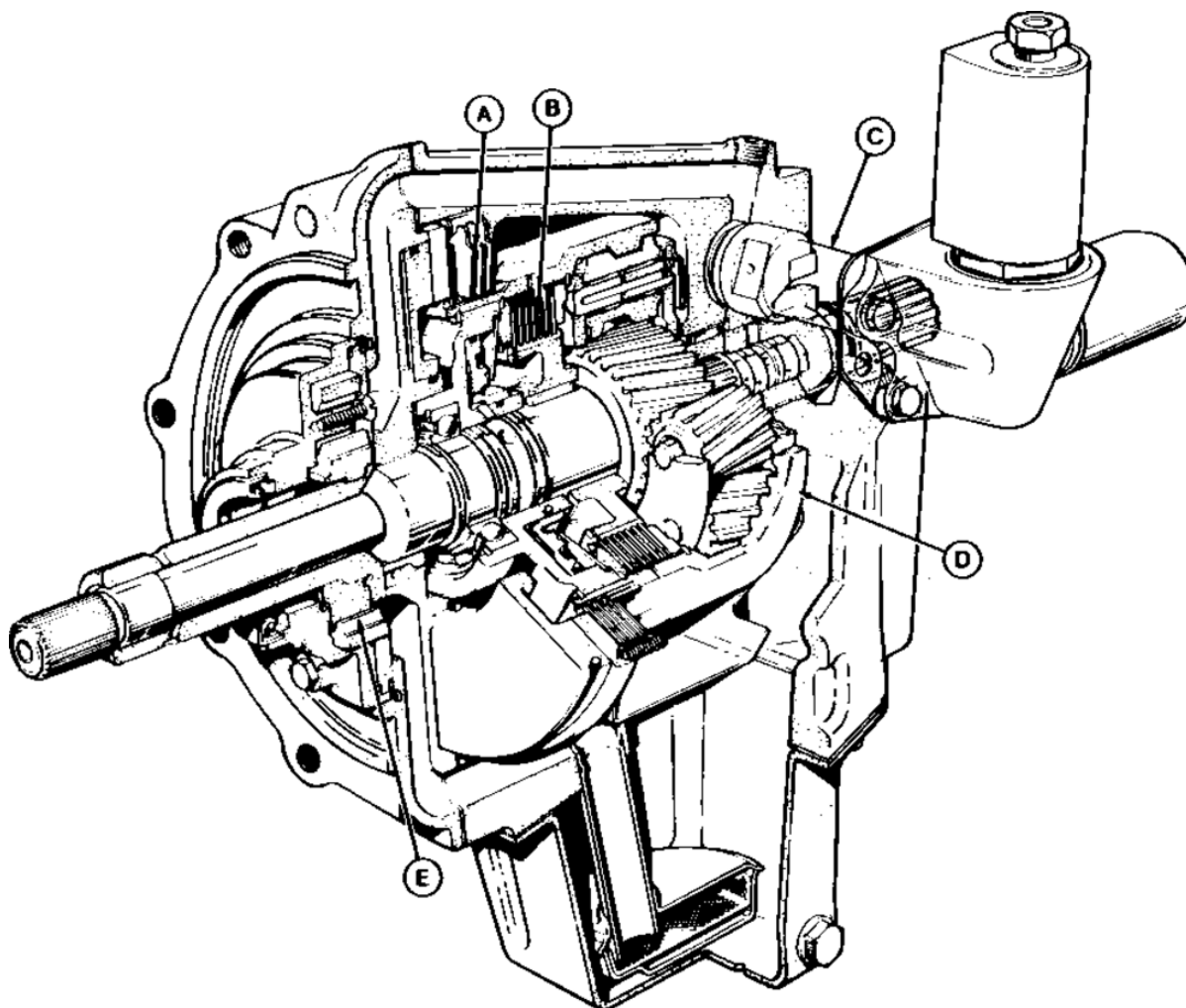
Differential Drive Shaft: Drive Shaft	End Play	0.05-0.10 mm (0.002-0.004 in.)
Differential Drive Shaft: Drive Gear Quill Cap Screw	Torque	72 N·m (53 lb-ft)
Differential Drive Shaft: Output Shaft Quill Cap Screw	Torque	75 N·m (55 lb-ft)
Differential Drive Shaft: Transfer Case to Transaxle Cap Screws and Nuts	Torque	115 N·m (85 lb-ft)

Item	Measurement	Specification
Lube Pump		
(SN -796033) Pump-to- Transmission	Distance	96 mm (3.78 in.)
(SN 796034-) Drive Shaft	End Play	0.8-1.0 mm (0.03-0.04 in.)

Item	Measurement	Specification
Drive Shaft Lock Nut	Torque	68 N·m (50 lb-ft)
Second Speed Gear-310D, 315D	Minimum End Play	0.07 mm (0.003 in.)

**tm1497 - 300D, 310D, 315D Backhoe Loaders Repair
Reverser Repair Information**

Reverser Repair Information



T7366BE-UN: Early Reverser Unit Shown

LEGEND:

- A - Reverse Brake
- B - Forward Clutch
- C - Directional Control Valve
- D - Planetary Assembly
- E - Oil Pump

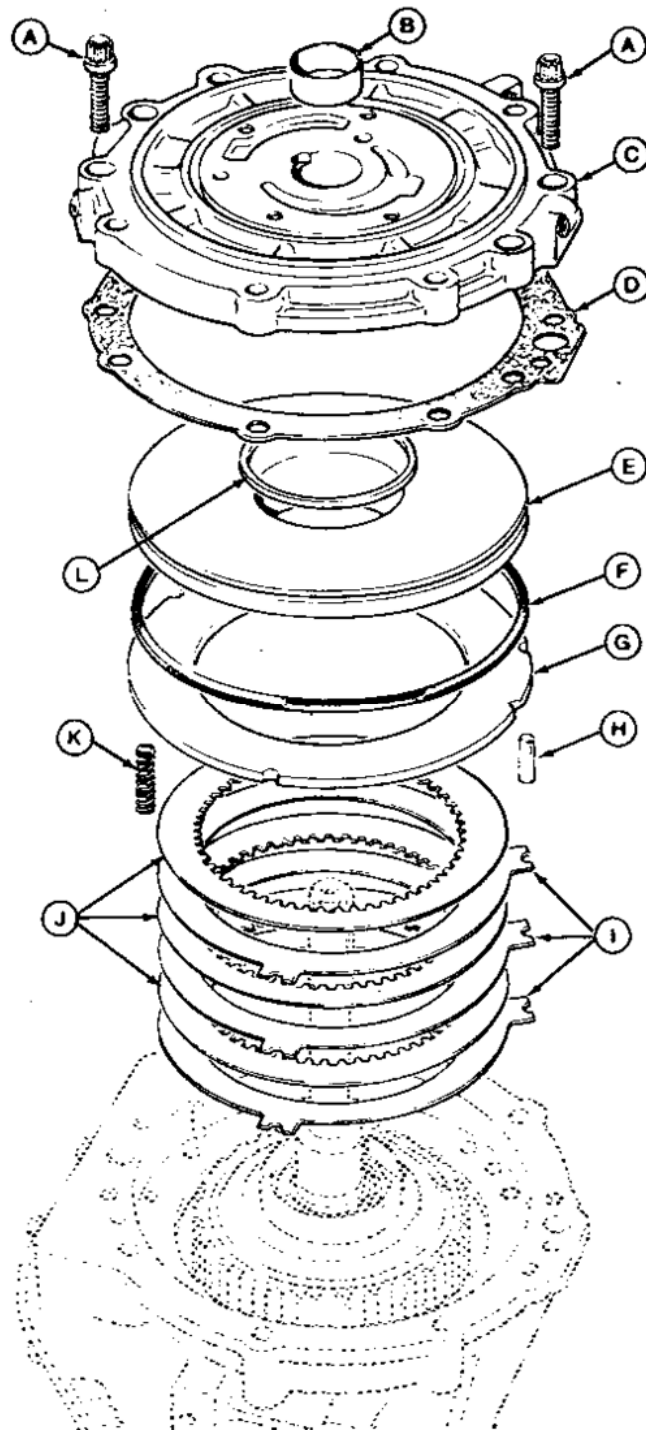
The main mechanical components of the reverser, reverse brake (A), forward clutch (B) and planetary assembly (D), are covered in this group.

For repair of the hydraulic components, directional control valve (C) and oil pump (E), [refer to Group 0360](#).

For later reversers, the solenoid coils are mounted directly on the reverser case.

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair
Remove And Disassemble Front Cover And Reverse Brake

Remove And Disassemble Front Cover And Reverse Brake



T6200AG-UN: Front Cover And Reverse Brake

LEGEND:

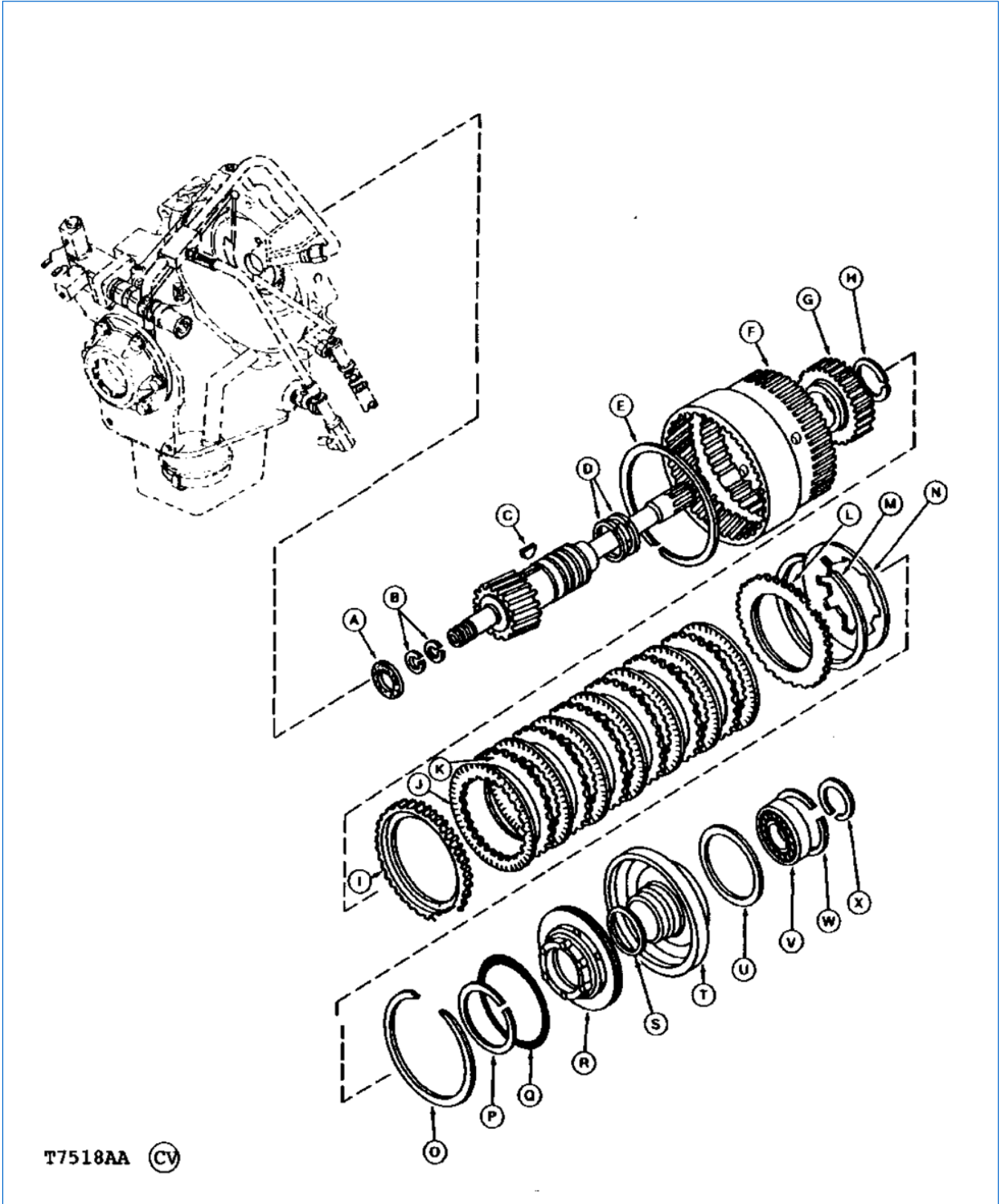
- A - Screw (4 used)
- B - Bushing
- C - Cover
- D - Gasket
- E - Piston
- F - Packing

G - Pressure Plate
H - Dowel Pin (3 used)
I - Plate (3 used)
J - Disk (3 used)
K - Spring (11 used)
L - Packing

Inspect parts for wear or damage; replace as necessary.

Use a press to install new bushing (B) in front cover (C). Check inside diameter of bushing. Bushing should measure 34.93-34.95 mm (1.375-1.376 in.). If necessary, use a hone to obtain correct diameter.

Remove And Disassemble Input Shaft And Forward Clutch

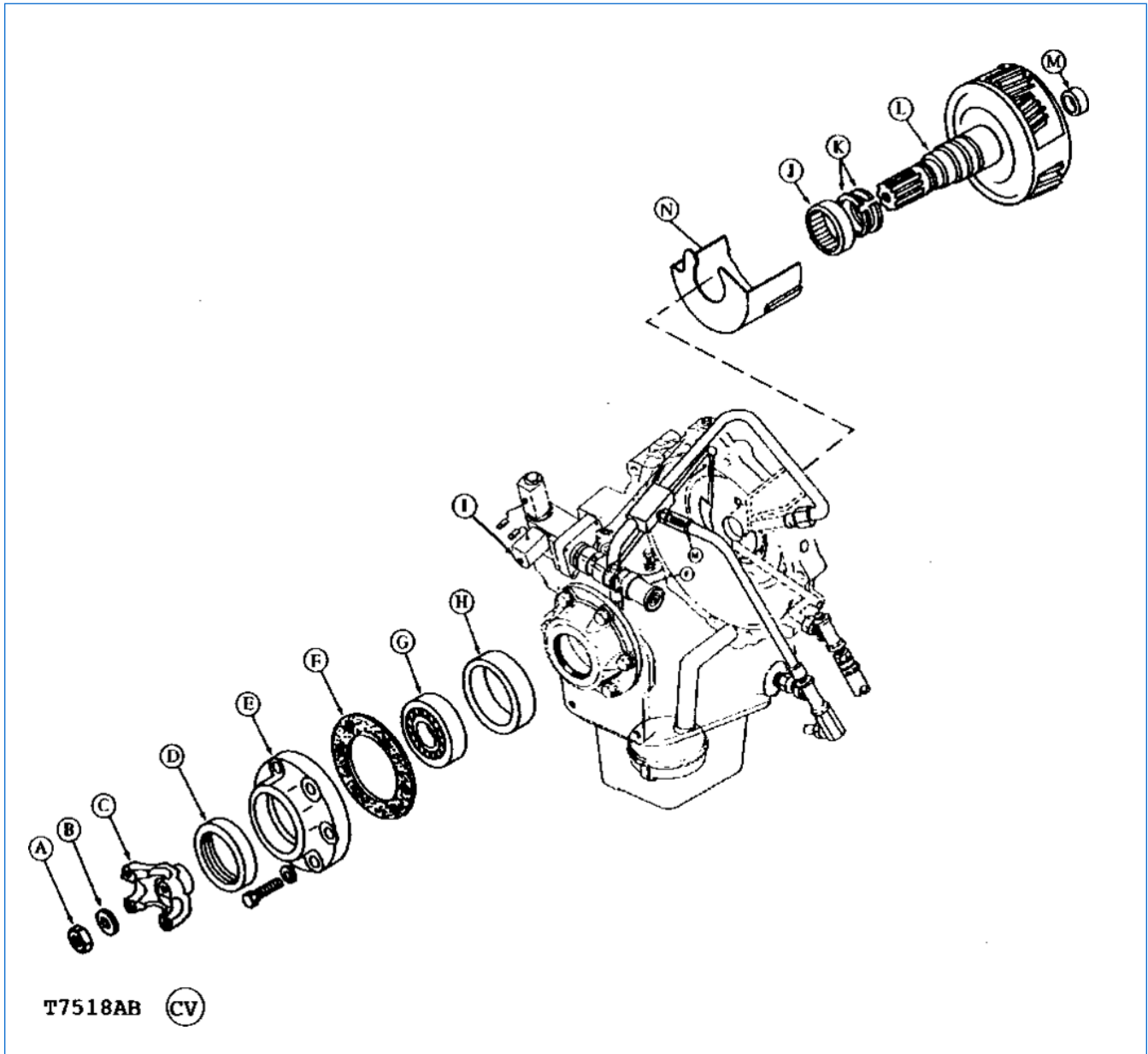


LEGEND:

- A - Thrust Washer
- B - Sealing Ring (2 used)
- C - Shaft Key
- D - Sealing Ring (2 used)
- E - Snap Ring
- F - Clutch Housing
- G - Clutch Hub
- H - Snap Ring
- I - Pressure Plate
- J - Disk (7 used)
- K - Plate (6 used)
- L - Pressure Plate
- M - Snap Ring
- N - Clutch Spring
- O - Snap Ring
- P - Bearing Ring
- Q - Packing
- R - Piston
- S - Packing
- T - Housing
- U - Thrust Washer
- V - Bearing
- W - Snap Ring
- X - Snap Ring

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair
Remove Planetary Assembly And Bearing Retainer

Remove Planetary Assembly And Bearing Retainer



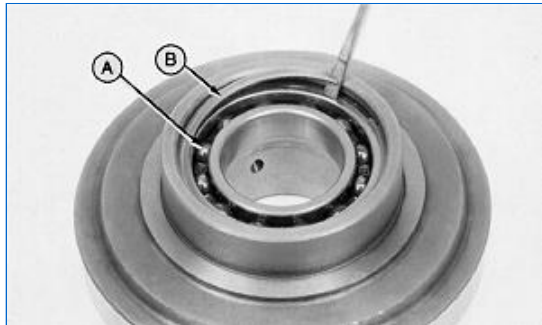
T7518AB-UN: Planetary Assembly And Bearing Retainer

LEGEND:

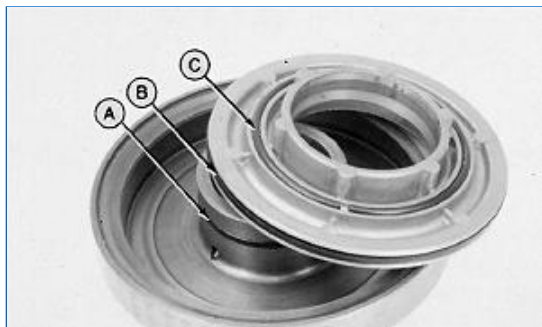
- A - Nut
- B - Washer
- C - Yoke
- D - Seal
- E - Retainer
- F - Gasket
- G - Bearing
- H - Sleeve
- I - Housing
- J - Bearing
- K - Sealing Ring (2 used)
- L - Planetary Assembly
- M - Bearing
- N - Baffle

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair Assemble Input Shaft And Forward Clutch

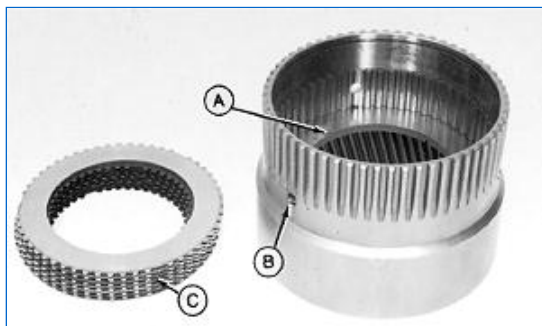
Assemble Input Shaft And Forward Clutch



1. T5983AN-UN: Bearing And Bearing Retainer Ring
Install bearing (A) and bearing retainer ring (B).
-



2. T5983AO-UN: Packings And Bearing Bearing Ring
Put petroleum jelly on packings. Install packings (A and B).
 3. Install piston. Be sure packings are not rolled or damaged when installing piston.
 4. Install bearing bearing ring (C).
-



5. T7509AV-UN: Pressure Plate/Area W/o Teeth/Lube Passages
Install pressure plate (A) with smooth side facing up.
6. **IMPORTANT:**

DO NOT block three lube passages (B) when installing disks and plates.

Install seven disks and six plates. The area without teeth (C) on the disks must be installed over the lube passages (B).

7. Install top pressure plate with smooth side down.
-

8. **IMPORTANT:**

For correct operation, snap ring MUST be within tolerance.



T5983AR-UN: Measure Snap Ring Thickness

Measure snap ring thickness. Snap ring must be 2.3-2.4 mm (0.090-0.094 in.) thick.

9. **NOTE:**

Snap ring does not fit into a groove.

Install correct snap ring.



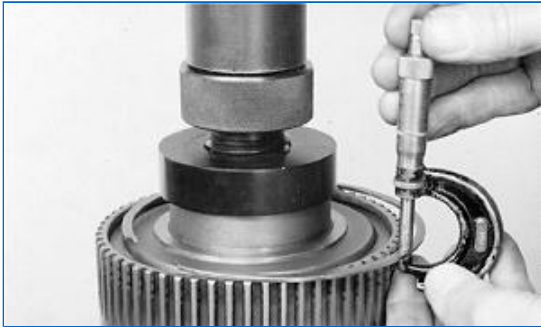
10. T7509BB-UN: Clutch Spring And Piston Assembly

Install clutch spring (A) concave side down.

11. Install piston assembly (B) using a press.

12. **IMPORTANT:**

For correct operation, snap ring MUST be within tolerance.



T5983AS-UN: Measure Snap Ring Thickness

Measure snap ring thickness. Snap ring must be 1.9-2.0 mm (0.074-0.078 in.) thick.

13. Use a press to move housing enough to install snap ring into groove. Turn housing over and seat housing against snap ring using a brass drift.

14. **IMPORTANT:**

For correct clutch operation, end play between rear pressure plate and lip in the housing must be correct.



T5985AP-UN: Use A Feeler Gauge To Measure The Distance

Push rear pressure plate down evenly with approximately 44.5 N (10 lb) force to remove all space between disks. Use a feeler gauge to measure the distance between rear pressure plate and lip.

15. Install correct snap ring or combination of snap rings to reduce clutch pack clearance to 0.5-0.9 mm (0.021-0.036 in.).

Item	Measurement	Specification
Clutch Pack	Clearance	0.5-0.9 mm (0.021-0.036 in.)

Two thin snap rings may be used to obtain proper clutch pack clearance.

16. **NOTE:**

Selective snap rings have a free diameter of approximately 145.5 mm (5.68 in.). Snap rings are colored-coded to help identify the thickness of each snap ring. Use table below as a guide.

Item	Measurement	Specification
Snap Rings-Green	Thickness	1.3-1.4 mm (0.059-0.054 in.)
Snap Rings-Purple	Thickness	1.5-1.6 mm (0.062-0.066 in.)
Snap Rings-Orange	Thickness	1.7-1.9 mm (0.074-0.078 in.)
Snap Rings-Blue	Thickness	2.1-2.2 mm (0.084-0.088 in.)
Snap Rings-White	Thickness	2.4-2.5 mm (0.096-0.100 in.)
Snap Rings-Green and Orange	Thickness	3.0-3.3 mm (0.124-0.132 in.)

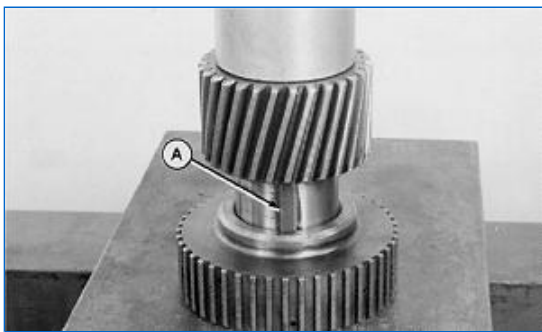


T5985AO-UN: Correct Snap Ring

Install correct snap ring (A).

17. **IMPORTANT:**

Shaft key (A) and key way must be aligned.



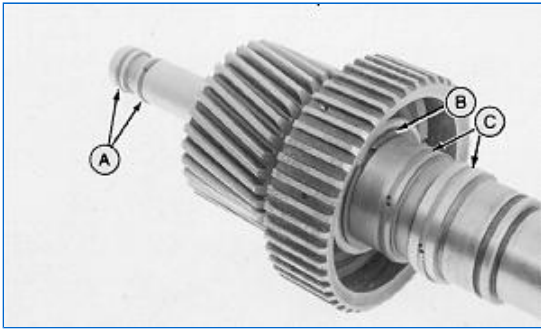
T5983AG-UN: Shaft Key

Install shaft key (A).

18. Use a press and a 2.0 ID x 2.375 OD x 8.00 in. long piece of round tubing to install gear.

19. **IMPORTANT:**

To prevent damage to sealing rings (A) during assembly, use petroleum jelly to hold rings in grooves.



T5984AA-UN: Sealing Rings And Snap Rings

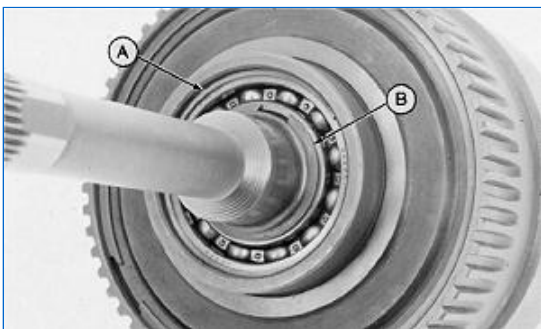
Put petroleum jelly on sealing rings. Install snap ring (B) and sealing rings (A and C). Be sure sealing rings turn freely and do not bind in shaft grooves.



20. T5984AB-UN: Input Shaft

Install input shaft. Turn shaft to align splines of clutch hub with splines of disks.

21. Install bearing with a press and a 1.625 ID x 2.00 OD x 8.00 in. long piece of round tubing.
-



22. T5988AA-UN: Snap Rings

Install snap rings (A and B).

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair Assemble Bearing Retainer

Assemble Bearing Retainer



1. T5988AB-UN: Oil Seal

Install new oil seal using a press and 53 mm and 77 mm disks. Install seal tight against retainer shoulder.



2. T7971AS-UN: Ball Bearing In Bearing Retainer

Install ball bearing in bearing retainer.

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair

Install Bearing Retainer

Install Bearing Retainer



1. T5988AD-UN: Sleeve

Install sleeve using a press and 69 mm and 90 mm disks. Install sleeve tight against housing shoulder.



2. T5988AE-UN: Gasket

Install new gasket (A).

3. Install retainer and cap screws. Tighten cap screws to 57-68 N·m (42-50 lb-ft).

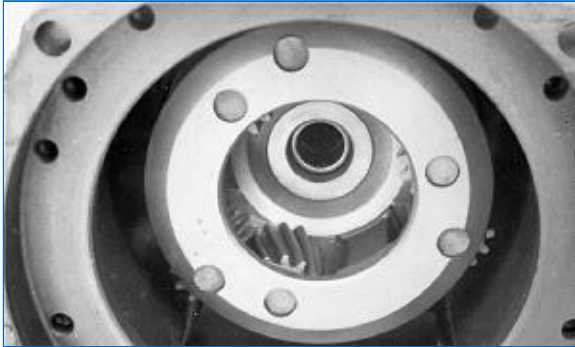
Item	Measurement	Specification
Reverser Bearing Retainer Cap Screws	Torque	57-68 N·m (42-50 lb-ft)

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair

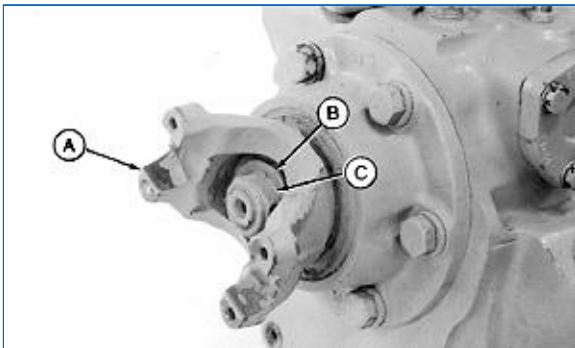
Install Planetary Assembly

Install Planetary Assembly

1. Install new needle bearing (A) to same depth as old needle bearing.
 2. Install baffle (B).
-



3. **T5988AG-UN: Planetary Assembly**
Install planetary assembly.
-

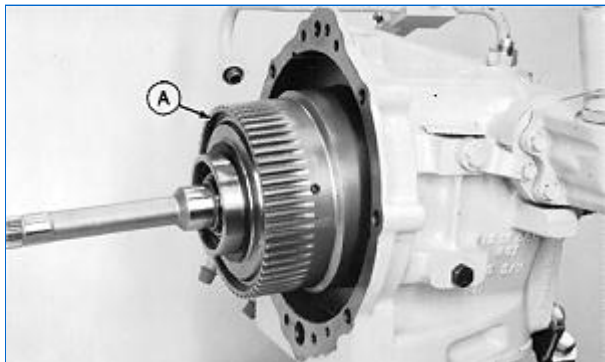


4. **T7971AT-UN: Output Shaft Yoke, Washer And Nut**
Install output shaft yoke (A), washer (B) and nut (C) on opposite end of planetary assembly. Tighten nut.
5. Remove nut and washer. Fill cavity between washer and end of output shaft with Gasket Maker to seal grooves of spline.
6. Install washer and nut. Tighten nut to 102-115 N·m (75-85 lb-ft).

Item	Measurement	Specification
Reverser Output Yoke Nut	Torque	102-115 N·m (75-85 lb-ft)

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair Install Input Shaft And Forward Clutch

Install Input Shaft And Forward Clutch

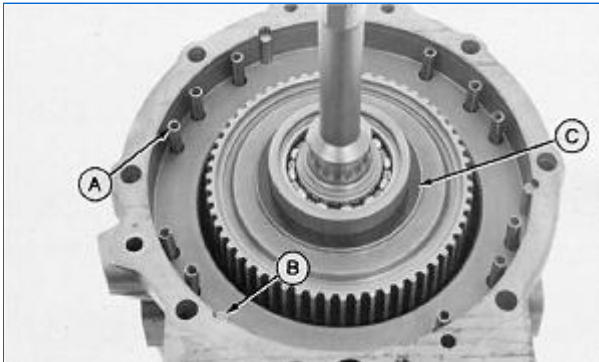


T7509AY-UN: Clutch Assembly

1. Install thrust washer.
2. Turn clutch assembly (A) when installing to align gear teeth. Use care to prevent damage to sealing rings.

tm1497 - 300D, 310D, 315D Backhoe Loaders Repair Assemble And Install Reverse Brake And Front Cover

Assemble And Install Reverse Brake And Front Cover



1. T5988AH-UN: Thrust Washer, Dowel Pins And Springs

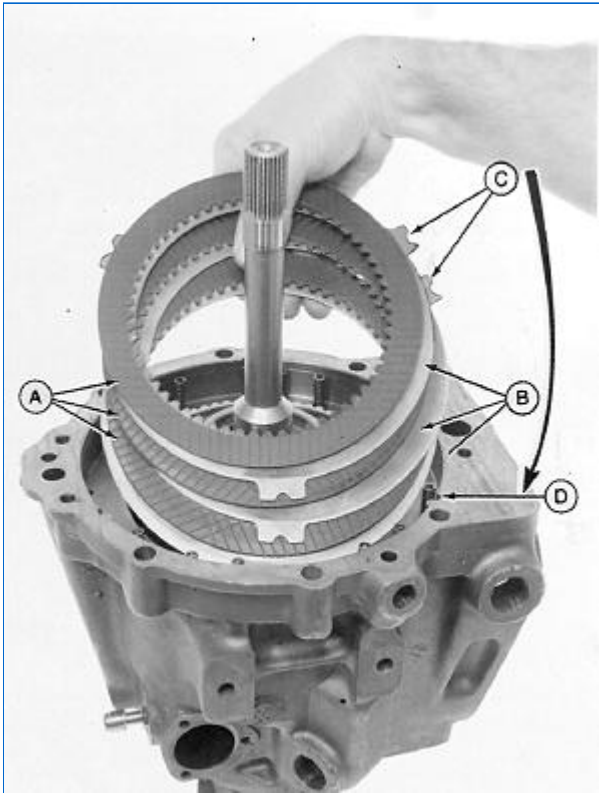
Install thrust washer (C).

2. Install three dowel pins (B) in slots in housing.
3. Install eleven springs (A).

-
4. **IMPORTANT:**

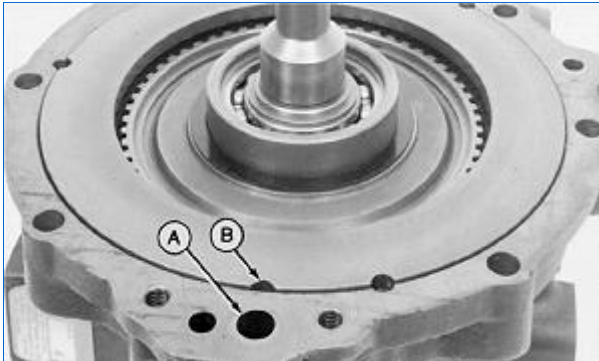
When viewing the reverser from the input shaft side, install off set tabs (C) over dowel pin (D) at the 7:00 o'clock position.

Install the widest ear of the tab to the right side of the dowel pin.



T5983AI1-UN: Disks, Plates & Off Set Tabs Over Dowel Pin

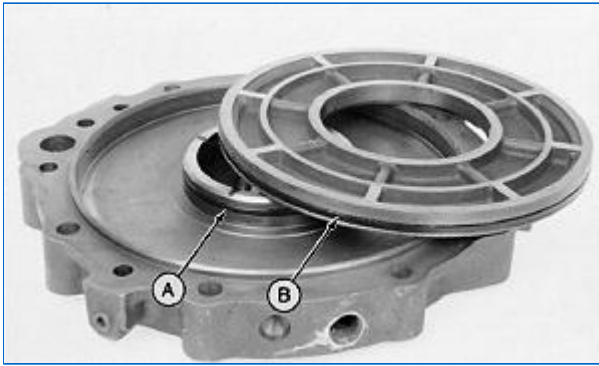
Put clean oil on disks. Install three disks (A) and three plates (B) as shown. Assemble odd-shaped lug over dowel as shown.



5.

T5988AI-UN: Press Plate W/'V' Slot Aligned W/large Oil Hole

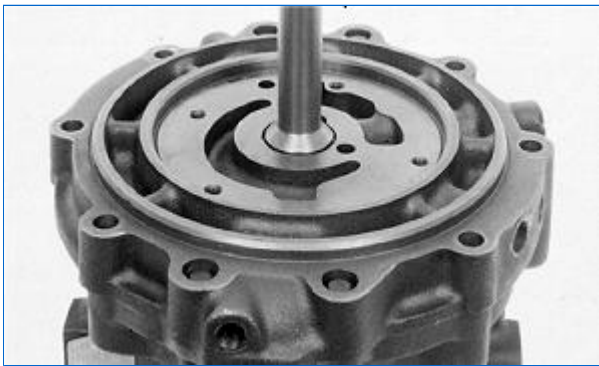
Install pressure plate with "V" slot (B) of pressure plate aligned with large oil hole (A) at top of case.



6. T5983AM-UN: Packings

Install new packings (A and B). Put petroleum jelly on packings.

7. Install piston.



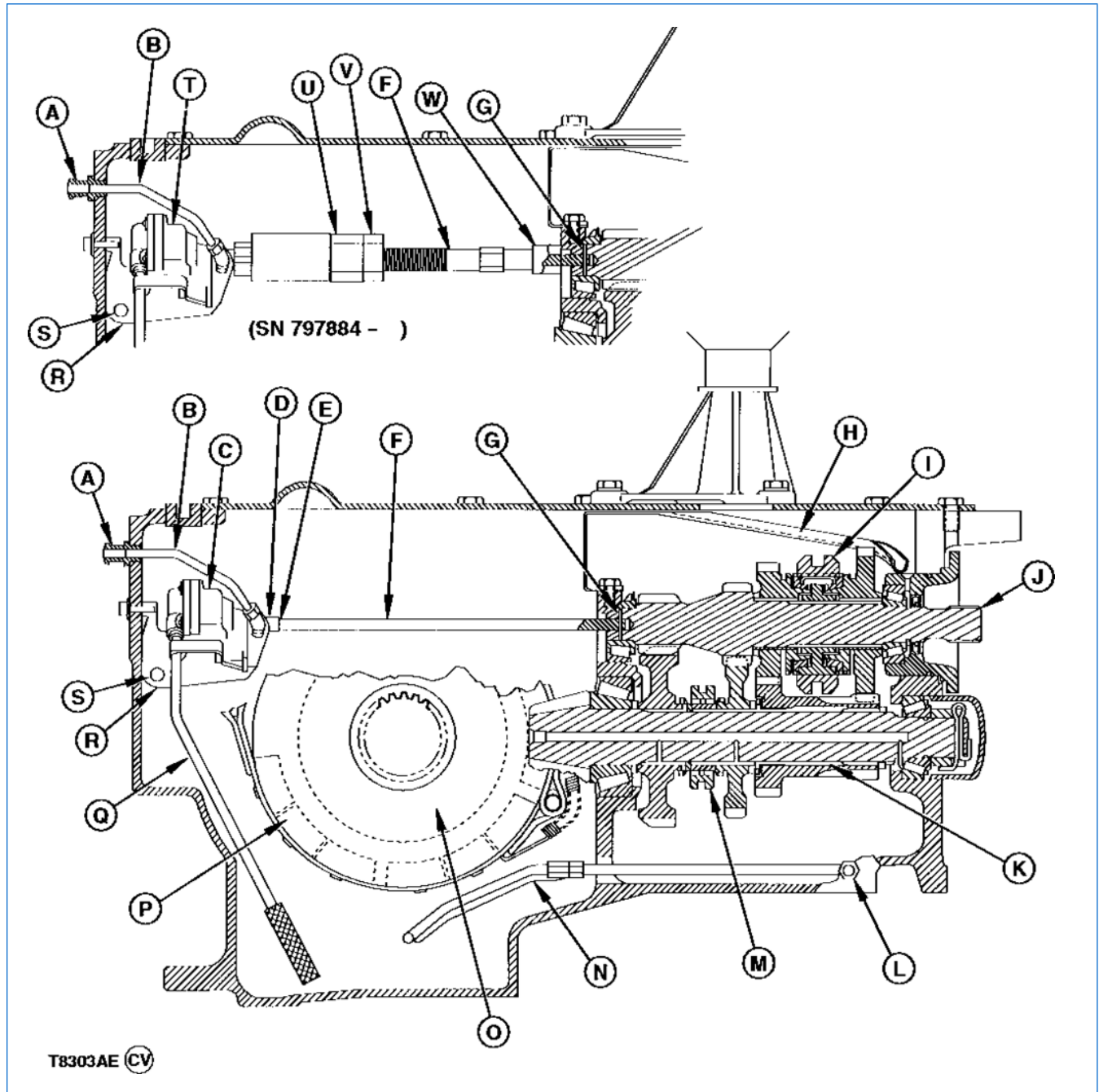
8. T5988AS-UN: Gasket

Install new gasket.

9. Install cover and cap screws. Tighten cap screws to 37-50 N·m (27-37 lb-ft).

Item	Measurement	Specification
Reverser Front Cover Cap Screws	Torque	37-50 N·m (27-37 lb-ft)

Transaxle-300D



T8303AE-UN: Transaxle Diagram

LEGEND:

- A - Pump Outlet to Cooler
- B - Pump Outlet Line
- C - Lube Pump
- D - Drive Shaft Sleeve
- E - Clamp
- F - Pump Drive Shaft
- G - Spring Pin
- H - Lube Trough
- I - Third and Fourth Gear Synchronizer
- J - Transmission Drive Shaft
- K - Differential Drive Shaft
- L - Case Inlet from Cooler
- M - Shift Collar
- N - Inlet Line to Brake Cavity

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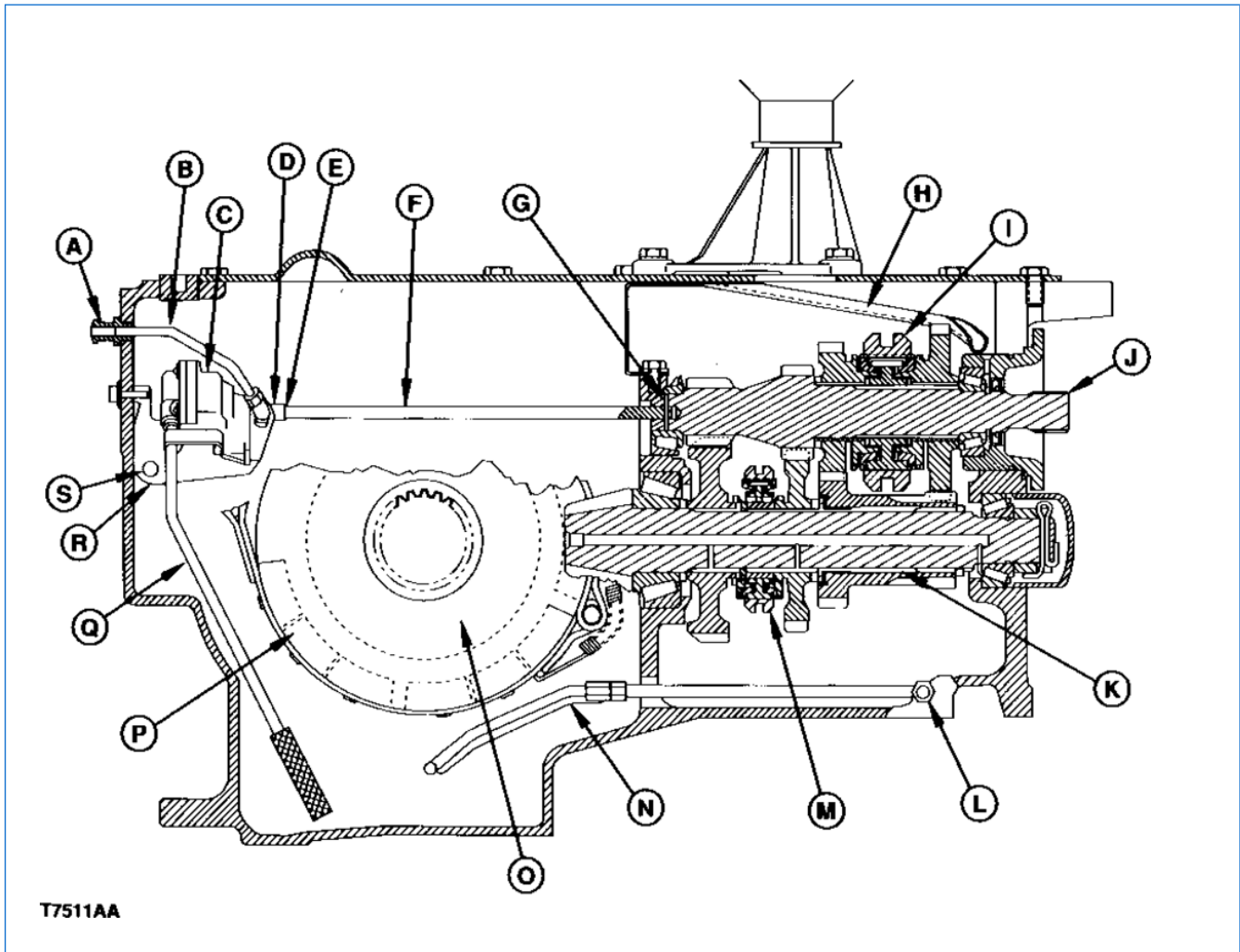
NOTE:

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document first and then
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O - Ring Gear
P - Parking Brake Band
Q - Suction Line
R - Pump Support Bracket
S - Pin
T - Lube Pump with Spline
U - Adjustment Sleeve
V - Lock Nut
W - Sleeve

**tm1497 - 300D, 310D, 315D Backhoe Loaders Repair
Transaxle-310D, 315D (SN -796033)**

Transaxle-310D, 315D (SN -796033)

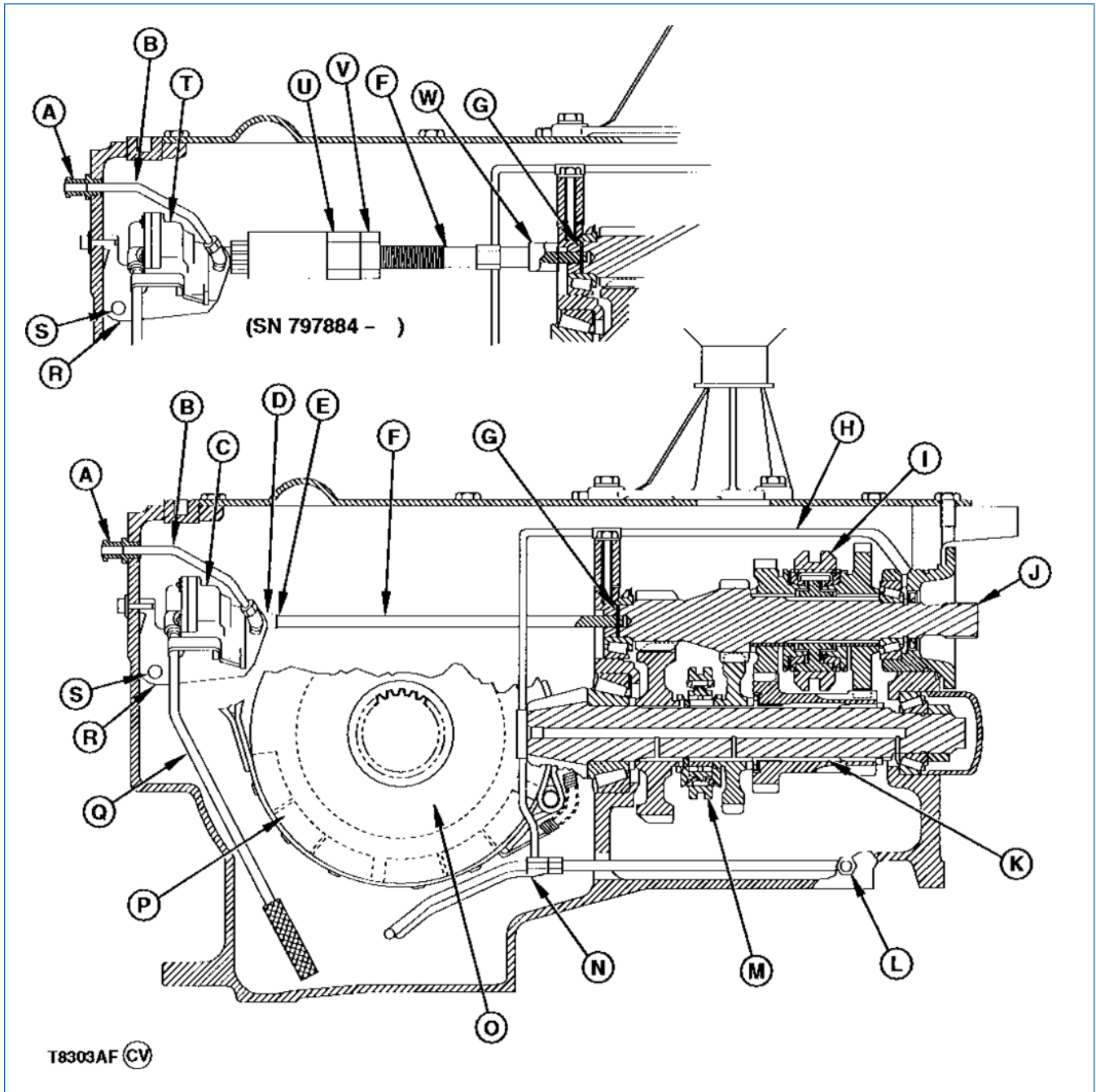


T7511AA-UN: Transaxle Diagram

LEGEND:

- A - Pump Outlet to Cooler
- B - Pump Outlet Line
- C - Lube Pump
- D - Clamp
- E - Drive Shaft Sleeve
- F - Pump Drive Shaft
- G - Spring Pin
- H - Lube Trough
- I - Third and Fourth Gear Synchronizer
- J - Transmission Drive Shaft
- K - Differential Drive Shaft
- L - Case Inlet from Cooler
- M - First and Second Gear Synchronizer
- N - Inlet Line to Brake Cavity
- O - Ring Gear
- P - Parking Brake Band
- Q - Suction Line
- R - Pump Support Bracket
- S - Pin

Transaxle-310D, 315D (SN 796034-)



T8303AF-UN: Transaxle Diagram

LEGEND:

- A - Pump Outlet to Cooler
- B - Pump Outlet Line
- C - Lube Pump
- D - Clamp
- E - Drive Shaft Sleeve
- F - Pump Drive Shaft
- G - Spring Pin
- H - Lube Line
- I - Third and Fourth Gear Synchronizer
- J - Transmission Drive Shaft
- K - Differential Drive Shaft
- L - Case Inlet from Cooler
- M - First and Second Gear Synchronizer
- N - Inlet Line to Brake Cavity